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ABSTRACT

This paper proposes a systematic model for objectively structuring the information exchanged between the bargainers in either the mediation or conciliation processes. The model is intended to be useful to mediators in organizing proposals to use with bargainers. The authors examine possibilities for an educational organization that uses pluralistic decision-making, has multiple interest groups, and allows an equal voice to all members in matters of educational interest. Proposed is a systematic model of the structure of information exchange processes among diverse constituencies. The approach used is the development of decomposition or rank reduction models. The paper suggests that no attempts at theorizing about educational institutions adequately explain collective bargaining, in which at least two large groups must compare and contrast their perspectives on many issues. Each individual in the organizational bargaining situation has a role in two formal groups (institution and union) and two informal groups (one in the institution and one in the union). Differing perspectives toward issues for an individual exists on assuming varying roles, and differing formal and informal group perspectives contribute to a complicated but accurate representation of information exchange. (Author/JM)

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Collective Bargaining: Impasse Resolution*

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The term "impasse" has many meanings. In the collective bargaining relationship an impasse is a situation that exists when representatives of labor and management fail to reach a mutual agreement over some issue involved in the employer-employee relationship (Bunker, 1973). This type of situation can arise at any stage of the collective bargaining process, such as in preparation for negotiations, during the negotiation of the agreement itself, or as part of the administration of a contract after an agreement is reached. The latter two stages are the more common points at which an impasse occurs.

Dispute Resolution

In order for parties to maintain effective and harmonious relationships it is crucial for labor and management to exhaust all efforts in resolving disputes that arise. A variety of approaches exist for parties to employ. Common to all these approaches, a third party is injected into the traditional bi-lateral collective bargaining relationship. The most frequently used third party mechanisms for peacefully resolving labor-management disputes include conciliation, mediation, arbitration, fact finding, and government intervention (Bunker, 1973).

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The subtle shades of differences among these processes involve the scope and character of the third party in attempting to resolve disputes. Thus, the information of major interest becomes the third party and how that third party might orchestrate the separate elements in the collective bargaining relationship toward a bilateral agreement.

The range of third-party involvement varies from getting the bargainers to talk in good faith (Conciliation) to the other extreme of government seizure or invoking legal provisions (Government Intervention). In terms of the role of the third party, it is as though a shift occurs: a shift away from the substance of the impasse and toward the new facts and relationships created by the existence and consequent behavior of the third party. Regardless of the particular role of the third party, the conflict remains and must be resolved.

While conflict can be devastating it can also be creative. Bargainers do not operate in a vacuum. One writer describes mediation as a form of intervention dedicated to ". . . nonrepressive assistance in problem-solving--by and not for the individuals or groups involved in a conflict situation" (Simkin, 1971). Indeed, mediation appears to be the most likely third-party mechanism to result in impasse resolution in the collective bargaining relationship. A recent survey of educators representing both management and workers (Evans, 1978) found that in excess of 60% of involved parties would like to culminate collective bargaining at either the mediation or fact-finding stage.

This paper proposes a systematic model for objectively structuring the information exhanged between the bargainers in either the mediation or conciliation processes. The model itself is especially useful to the third party in organizing proposals and recommendations to use with bargainers.

Typically in dispute resolution, a third party involves himself in activities focussed on procedural functions, communication functions, and substantive

functions (Simkin, 1971, p. 118). Other than the scheduling, locating and timing of meetings and agendas (procedural functions), the early stages of dispute resolution are exceedingly informal. As the communication function escalates, the third party's attention shifts to the nature of the issues--in particular the specification of those issues on which settlement has been reached, the listing of concessions made by each side at this point, and a statement of those issues yet in dispute. Once the nature of the issues is clear, establishing information about commitment to those issues and assessing the rigidity of each party on the positions become the focus. The important general point here is that the third party is continually processing information in his role.

In all the behavior repertoire available to the third party, there appears a fairly sophisticated and imaginative trial-and-error strategy. This involves such manuevers as trying-on-for-size, confidential exploration without expectation of commitment, smoking out priorities, deflating extreme positions, creating new positions and recommendations, etc. One third-party practitioner alludes to the distinctly manipulative character of this behavioral repertoire saying that it is ". . . designed to facilitate resolution by the parties and utilizing, for the most part, the proposals and ideas on disputed issues that are advanced by the negotiators themselves" (Simkin, 1971, pp. 98-99). Clearly a strategy using more information and alleviating both trial-and-error assessment and subjective retrieval would help.

Suggestions for Dispute Resolutions

Typically in two-party collective bargaining, several distinct situations exist. Common perceptions of the issues in dispute can be maintained with each bargainer taking discrepant positions on the issues. Another situation, wherein bargainer-specific issues exist in the presence of or simultaneously with a set of common issues, is perhaps more frequent. Not only can the bargainers possess disparate positions on the common issues but they may very likely be unaware

of or insensitive to one or more of each other's unique issues. A third, and least frequent, situation occurs when the issues are exclusively unique to both bargainers.

If the mediator, or third party, is reasonably convinced that bargaining is desirable, then clarification of the common issues and identification of the unique issues for both bargainers is imperative. It is within the purview of the third party's manipulative character to review and appraise the common issues at several stages throughout the dispute settlement process. This is in stark contrast to one mediator's observation that ". . . more likely, the information will be tucked away in the mediator's mind for use when it appears likely to contribute to progress" (Simkin, 1971, p. 90).

Additionally, the third party must continually monitor and frequently appraise a bargainer's interest in attaining settlement with regard to unique issues which have been raised. The distribution of consent between the two bargainers to attain settlement on any issue may be used to differentiate whether that particular issue is a member of a "must" or a "throw-away" list for the respective bargainers. It would seem as though this information developed in a comprehensive and systematic fashion would aid in the negotiation of a dispute settlement. Accordingly, the manipulative character of the third party might be guided by an iterative model possessing the capabilities of:

- developing bargainers' profiles on parameters encompassing common issues,
- displaying both bargainers' positions on the above parameters,
- detecting parameters underlying bargainer-unique issues,
- displaying both bargainers' positions on both sets of bargainer-unique parameters identified above.

At this point we draw attention to the specific and unique contribution of the model to be proposed. The term "comprehensive" as we use it includes a complete collection of the opinions of all members of both recognized bargaining teams, at least, and could reasonably be expanded to include all members of the

legally constituted governing boards of both sides in the dispute. Emphasis is on information and opinion from all those directly involved at every point in the negotiation. This distinct characteristic could embellish the already well-codified mechanisms for third-party behavior with two bargaining spokesmen. Further it could put more systematic processes at the disposal of a third party, particularly in situations where there is confusion or ambiguity with regard to the perspectives of the entire bargaining groups.

A Model for Analyzing Perspectives

Consider two bargaining groups in their entirety and a comprehensive series of K issues of contention or interest raised by both groups. These K issues can be compiled so that any and all group-specific matters of contention are included. In what follows it is presumed that the maximum total number of issues nominated by both groups is one less than the number of members in the smaller group.

It would be a simple matter to poll each individual of each group regarding his position on each of the K issues. After partitioning the total set of responses to the K issues into those of the respective two groups, the obvious question, "What is the group-specific structure of the issues?" may be answered. Comparison of the groups to determine mutuality of the structure can be accomplished, and the degree of one group's coherence toward the other group's specific structure of the issue can be established.

In a completely general form, the responses from the n_m members of the management group may be displayed as the rows of the matrix X_m, and the responses of n_w members of the worker group may be displayed as the rows of matrix X_w

The variance - covariance matrices for the respective groups are

$$X'_m X_m n_m^{-1} - 1' X_m X'_m 1 n_m^{-1} = S_m \text{ , and} \quad (1)$$

$$X'_w X_w n_w^{-1} - 1' X_w X'_w 1 n_w^{-1} = S_w . \quad (2)$$

The reasonableness of the assertion that the variance-covariance matricies of both groups arose from one and the same population, and hence that there is identical structure of the issues in each group, could be assesed by

$$\left\{1 - \frac{2K^2 + 3K - 1}{6(K+1)} \left(\frac{1}{n_m} + \frac{1}{n_w} - \frac{1}{n_m + n_w}\right)\right\} \left\{(n_m + n_w) \ln|S| - (n_m \ln|S_m| + n_w \ln|S_w|)\right\}. \quad (3)$$

The expression above is approximately distributed as the random variable chi square with $\frac{K(K+1)}{2}$ degrees of freedom. Both outcomes (I) identical structures for the K issues in both groups, and (II) unique structures for the K issues, are considered below.

I. If both groups arose from the same population, statistically speaking, the variance-covariance matrices are within sampling fluctuation of one another, and may be pooled to produce a more stable estimate of that population variance-covariance matrix than exhibited by either group. This pooled variance-covariance matrix, S, could be put in quadratic form with the inverse of a diagonal matrix containing square roots of corresponding elements of S, $(\text{diag } S)^{-\frac{1}{2}}$, to produce R, a standardized

form of pooled variance-covariance matrix among the K issue,

$$(\text{diag } S)^{-\frac{1}{2}} \; S \; (\text{diag } S)^{-\frac{1}{2}} = R \quad . \qquad (4)$$

R in turn could be reduced in rank, i.e. subjected to facor analysis. Each resulting linear combination of the K issues specifies a parameter central to the model describing the structure among the K issues. Thus a parameter may be thought of as a distinct configuration of the issues for which the degree of relationship between each issue and the parameter is objectively reported. The series of parameters may be arrayed as columns in the matrix P. Collectively this series of parameters and the specification of their interrelation is the model for the structure of the K issues.

The practical problem is one of assessing the position of the management group and the worker group in terms of the previously determined structure paramaters for the issues in dispute. To accomplish this the status of any particular group member in either group on each parameter identified in the model must be determined and summarized by group. Accordingly, the vertically adjoined form of X_m and X_w may be standardized by columns to produce Z.

$$Z = \begin{array}{c} \\ 1 \\ 2 \\ \vdots \\ i \\ \vdots \\ n_m \\ 1 \\ 2 \\ \vdots \\ j \\ \vdots \\ n_w \end{array} \begin{array}{c} \begin{array}{cccccc} 1 & 2 & \cdots & k & \cdots & K \end{array} \\ \left[\begin{array}{cccccc} & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ \hline & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \end{array}\right] \end{array}$$

The status of all members of both groups may by estimated on each consecutive parameter by

$$Z R^{-1} P = F \quad . \tag{5}$$

The columns of F will necessarily be standardized across both the mangement and worker groups. Subsequently F may be partitioned into both mangement and worker group-specific matrices. The usual summary information for describing the profile of either group according to the unitary structural parameters underlying the issues of dispute may be developed.

The profile typifying management would be its centroid on the parameters of the model and would be given by

$$E(F'_m) = 1' F_m n_m^{-1} \quad . \tag{6}$$

Correspondingly, the profile typifying workers would be given by

$$E(F'_w) = 1' F_w n_w^{-1} \quad . \tag{7}$$

The degree of dispersion about the respective profile in each group would be that group's variance-covariance matrix on the parameters of the model. The respective variance-covariance matrices on the parameters of the model are given by

$$\text{VAR,COV } (F_m) = F'_m F_m n_m^{-1} - 1' F_m F'_m 1 n_m^{-1} \text{ and} \tag{8}$$

$$\text{VAR,COV } (F_w) = F'_w F_w n_w^{-1} - 1' F_w F'_w 1 n_w^{-1} \tag{9}$$

Now that the profiles of both mangement and workers have been developed the question is, "How similar are these profiles?" Additionally the consistency of agreement with each group about the respective typifying profile is of interest. Either of these questions may be assessed at this point by applying conventional multivariate analytical techniques.

II. When both groups arise from <u>different</u> populations, statistically speaking, distinct variance-covariance matricies exist for management and workers and separate parameterization of the K issues nominated collectively by the groups must proceed. In such circumstances $S_m \neq S_w$, and structures underlying all K issues must be developed separately. Essentially P_m and P_w may be developed by subjecting R_m and R_w respectively to rank-reduction procedures, where

$$R_m = (\text{diag } S_m)^{-\frac{1}{2}} S_m (\text{diag } S_m)^{-\frac{1}{2}} , \text{ and} \qquad (10)$$

$$R_w = (\text{diag } S_w)^{-\frac{1}{2}} S_w (\text{diag } S_w)^{-\frac{1}{2}} . \qquad (11)$$

Two cases could eventuate - - Case A, similar rank for P_m and P_w (i.e., same number of parameters) or Case B, dissimilar rank (i.e., different number of parameters) underlying the structure of the K issues. Each is discussed below.

<u>Case A (Rank of S_m = Rank of S_w).</u>

When P_m and P_w have the same number of columns consider one, say w, as a "target" or referrant group. The question of "How well does P_m approximate P_w?" may be addressed by transforming P_m into a least-squares fit to P_w. The 'P_w' thus formed, $P_{w \cdot m}$, may be evaluated to determine if it gives a better than chance fit to P_w. The degree of fit would be exceedingly useful to the third party by objectively aiding him in "trying positions on for size" and confidentially exploring positions with both groups without making commitment to either.

The approximation of the Worker group's model for structuring the K issues given the management group's model of the same K issues is $P_{w \cdot m}$ in the following

$$P_m T_{m \rightarrow w} = P_{w \cdot m} \rightarrow P_w , \qquad (12)$$

and the transformation matrix for accomplishing a best least-squares

fit of P_m to P_w is

$$T_{m \rightarrow w} = (P_m' P_m)^{-1} P_m' P_w \quad . \qquad (13)$$

By considering the management and worker group each in turn as the "target" group, a least-squares approximation of the unique model of one group may be obtained from the other. In essence the perspective or structure of the K issues maintained by one group serves as the basis onto which the other group perspective of the same issues can be mapped. Moreover the degree of fit may be evaluated, and records of changing values in the status of these degrees of fit may be used by the third party to chart progress in the dispute resolution over mediation sessions. Again "must" and "throw away" issues can be delineated together with an index of interest in reaching settlement developed from the distribution of consent between the groups.

To aid the third party in manipulating the focus on specifics, interest may center on determing the status of any particular management group member's status either on each parameter identified in his group perspective or in terms of each approximated parameter identified according to the worker group's perspective of K issues. Parallel to the pooled-group variance-covariance matrix developed at the outset of Case A, the management group's unique variance-covariance matrix of the K issues may be scaled to produce its standardized form

$$(\text{diag } S_m)^{-\frac{1}{2}} S_m (\text{diag } S_m)^{-\frac{1}{2}} = R_m \quad . \qquad (14)$$

Additionally X_m may be standardized by column to produce Z_m such that $Z_m' Z_m n^{-1} = R_m$. Finally the status of any particular management group member on each consecutive parameter of his groups model, P_m, is

the corresponding row of G_m, given by

$$Z_m R_m^{-1} P_m = G_m \qquad (15)$$

In distinction, the status of that particular management group member on each consecutive approximated parameter of the management group's least-square approximation of the model of the worker group, $P_{w \cdot m}$, is the respective row of $G_{w \cdot m}$ given by

$$Z_m R_m^{-1} P_{m \cdot w} = G_{m \cdot w} \quad . \qquad (16)$$

Not only can the third party isolate and manipulate specific disparate members of management group vis-a-vis the management group's own perspective and vis-a-vis the best approximation or understanding of the worker group's perspective of the same K issues of dispute he may be interested in summarizing the two perspectives.

The usual summary information describing the similarity between the management group's unique perspective of the K issues and the management group's best approximation of the worker group's perspective may be developed. The covariance between on the one hand, the parameters describing the structure of the K issues within the management group, and on the other hand, the "best approximations" of the parameters describing the structure of same issues on behalf of the worker group is given by

$$\text{COV}\ (G_m, G_{w \cdot m}) = G_m' G_{w \cdot m} n_m^{-1} \quad . \qquad (17)$$

This covariance matrix could be scaled into a standardized-form covariance matrix containing validity coefficients between the parameters of the two models perceived by the management group, P_m and $P_{w \cdot m}$, to produce $R_{m \cdot w}$ as follows,

$$R_{m \cdot w} = (\text{diag}\ G_m' G_m n_m^{-1})^{-\frac{1}{2}} (G_m' G_{w \cdot m} n_m^{-1}) (\text{diag}\ G_{w \cdot m}' G_{w \cdot m} n_m^{-1})^{-\frac{1}{2}} \quad . \qquad (18)$$

By similar arguments the worker group's "best approximation" of the perspective maintained by the management group toward the K issues of dispute, and $T_{w \to m}$, $P_{m \cdot w}$, C_w, $G_{m \cdot w}$, COV (G_w, $G_{m \cdot w}$), and eventually $R_{w', m \cdot t}$ may be developed. Subsequently the validity coefficients between the parameters of the two models as perceived by the worker group, P_w and $P_{m \cdot w}$, may be examined by the third party to assess the understanding that exists on the "other side of the table."

Case B (Rank Sm $\neq$ Rank Sw).

When P_m and P_w have differing numbers of columns, attention focuses on how well P_m and P_w approximate both the management and worker group perspective or structure of the same K issues. This can be accomplished by fitting both P_m and P_w alternatively to the standardized form of both management and worker group responses to the K issues, Z_m and Z_w.

Accordingly, fitting both P_m and P_w to Z_m may be accomplished by

$$Z_m R_m^{-1} P_m = G_m, \text{ and} \tag{15}$$

$$Z_m R_m^{-1} P_w = H_{w \cdot m} . \tag{19}$$

Alternatively, fitting both P_m and P_m to Z_w results in

$$Z_w R_w^{-1} P_m = H_{m \cdot w}, \text{ and} \tag{20}$$

$$Z_w R_w^{-1} P_w = G_w . \tag{21}$$

Just as the status of any particular management group member on each consecutive parameter of his group's model is given by a particular row in G_m, the corresponding row in $H_{w \cdot m}$ contains that same management group member's status on the consecutive parameters of the worker group model. Note that $G_{m \cdot w}$ and $H_{m \cdot w}$ differ in that $H_{m \cdot w}$ does not involve

a least-squares approximation of the parameter composing the management group model prior to estimating any worker group member's status. $H_{m \cdot w}$ contains estimates of the status of any particular worker group member on the parameters as identified within the management group. This reflects the manner in which Case B differs from Case A; no intermediate step of approximating the other group's parameters is executed because of the different ranks of P_m and P_w.

The third party's manipulations may require knowing any particular group member's status either on each parameter of the model identified in his group (a particular row in G), or in terms of the parameters identified in the disputing group (the corresponding row in H). Additionally, and typically of more importance to the manipulative role of the third party, the usual summary information describing the status of all members may be developed. The profile typifying the management group in terms of the perspective identified within the worker group is given by

$$E\,(H'_{w \cdot m}) = 1' H_{w \cdot m} n_m^{-1}, \text{ and} \qquad (22)$$

the profile typifying the worker group in terms of the perspective identified within the management group is given by

$$E\,(H'_{m \cdot w}) = 1' H_{m \cdot w} n_w^{-1} \quad . \qquad (23)$$

The degree of dispersion within the management group about the profile in (22) would be the variance-covariance matrix taken about this centroid, and is given by

$$\text{VAR,COV}\,(H_{w \cdot m}) = H'_{w \cdot m} H_{w \cdot m} n_m^{-1} - 1' H_{w \cdot m} H'_{w \cdot m} 1 n_w^{-2} \qquad (24)$$

Correspondingly, the dispersion within the worker group about their profile in (23) would be given by,

$$\text{VAR,COV}\,(H_{m \cdot w}) = H'_{m \cdot w} H_{m \cdot w} n_w^{-1} - 1' H_{m \cdot w} H'_{m \cdot w} 1 n_m^{-2} \qquad (25)$$

Hence, where dissimilar perspectives of the same issues exist between management and worker groups, the extent to which either group is compatible or distinguishable from the other group may be assessed at this point with the aid of conventional multivariate analytical techniques.

Regardless of either outcome I or II, and either Case A or Case B for the latter outcome, the models for protraying perspectives of disputing groups may be considered iteratively if polls are taken sequentially by the third party at appropriate junctures in the dispute settlement process.

Implications

The comprehensive and objective processing of information throughout the mediation or conciliation processes of dispute settlement have been emphasized in this paper. The proposed dispute-settlement model attempts to maximize the efficiency of the third party's communication and substantive functions. This is accomplished by facilitating his appropriate selection of mediative strategies from the behavioral repertoire of substantive functions. However there are additional implications of the dispute-settlement model.

The iterative and continuous monitoring potential of the model are suggestive of adaption to automated communication systems with rapid processing and instantaneous display capabilities. This type of communication system makes unnecessary the geographical proximity for centralized, face-to-face, bargaining in dispute settlements that frequently continue for extended lengths of time. It also enables widespread, representative, and diverse membership on bargaining teams. In fact the potential exists for utilizing the proposed model for on-going resolution of differences between management and worker perspectives within the organization.

The logical model, if fully used, would enable the behavior and values of both mediators and bargainers to represent a blend of the best parts of the

major types of bargaining strategies practiced in contract negotiation today. Of the four hypothetical types of bargaining suggested by Walton and McKersie (1965), the model precludes "distributive bargaining", where only two individuals with fixed and opposing values are involved in a presumptive win-lose strategy and avoids the need for "intraorganizational bargaining", where activities take place in order to bring the expectation of bargaining teams ". . . into alignment with those of the chief negotiator" (French, 1978, p. 499).

The model emphasizes a blend in character between the two more valued hypothetical types of bargaining suggested by Walton and McKersie (1965). "Integrative bargaining" is directly accomplished by merging group-specific issues and identifying commonalities between bargaining group perspectives. Thus, the use of the model implies that there are areas of concern and that the degrees of agreement and difference can be specified as a point of focus in the bargaining process. Further, the iterative application of the model with the revision of both bargaining-group perspectives following complete (from all members) disclosure enables "attitudinal structuring", where the negotiations themselves serve to change attitudes and relationships.

Finally, the potential exists for documentation and preparation of a social register for the bargaining process. This may be accomplished by examining the legend of structured perspective changes, i.e. reparameterization of a bargaining-group's model, recorded over successful iterations of the dispute-settlement model. Clearly, this documentation is enhanced by the retrieval capabilities of an automated communication system. Hence, there is the prospect for researching the bargaining process itself.

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